CLAIMS

We claim:

1. An inverter/converter cooling chamber comprising,

a thermally isolated housing,

a hermetic container at least partially disposed in said thermally isolated housing,

an ambient cooling zone disposed interstitially between said hermetic container and said thermally isolated housing for indirect non-contact cooling of inverter/converter components,

a liquid refrigerant zone at least partially disposed in said hermetic container for direct liquid refrigerant contact cooling of inverter/converter components,

a vapor refrigerant zone at least partially disposed in said hermetic container adjacent said liquid refrigerant zone for direct vapor refrigerant contact cooling of inverter/converter components.

2. The cooling chamber of Claim 1 wherein said hermetic container is a pressure vessel material selected from the group consisting of steel, magnetic material, non-magnetic material, metals, and non-metals.

3. The cooling chamber of Claim 1 wherein said hermetic container further comprises a liquid refrigerant inlet and a vapor refrigerant outlet.

4. The cooling chamber of Claim 3 wherein said vapor refrigerant outlet further comprises an extended outlet coil at least partially disposed in said ambient cooling zone.

5. The cooling chamber of Claim 1 wherein said hermetic container further comprises a sealed power connector and a sealed signal connector.

6. The cooling chamber of Claim 1 wherein said hermetic container further comprises at least one cooling fin.

7. The cooling chamber of Claim 6 wherein said cooling fins are refrigerant filled.

8. The cooling chamber of Claim 6 wherein said cooling fins are solid material.

9. The cooling chamber of Claim 1 wherein said hermetic container and thermally isolated housing further comprise EMI shielding selected from the group consisting of metal mesh and foil.

10. The cooling chamber of Claim 1 wherein said chamber cools power electronic components of vehicles selected from the group consisting of hybrid and full electric.

11. The cooling chamber of Claim 1 wherein said chamber is disposed as a liquid refrigerant accumulator component of a vapor compression refrigeration system.

12. The cooling chamber of Claim 1 wherein said refrigerant is selected from the group consisting of the phase change working fluids listed in ASHRAE Standard 34-2001.

13. The cooling chamber of Claim 1 wherein said chamber is disposed as an intermediate-temperature evaporator component of a vapor compression refrigeration system.

14. The cooling chamber of Claim 13 wherein said chamber is disposed in an intermediate pressure suction tapping line.

15. A method of cooling inverter/converter components comprising the steps of,

providing a thermally isolated housing,

providing a hermetic container at least partially disposed in said thermally isolated housing,

mounting at least a portion of said inverter/converter components in an ambient cooling zone disposed interstitially between said hermetic container and said thermally isolated housing for indirect non-contact cooling,

mounting at least a portion of said inverter/converter components in a liquid refrigerant zone at least partially disposed in said hermetic container for direct liquid refrigerant contact cooling,

mounting at least a portion of said inverter/converter components in a vapor refrigerant zone at least partially disposed in said hermetic container adjacent said liquid refrigerant zone for direct vapor refrigerant contact cooling,

flowing a refrigerant through said hermetic container to remove heat dissipated by said inverter/converter components.

16. The method of Claim 15 wherein said hermetic container is a pressure vessel material selected from the group consisting of steel, magnetic material, non-magnetic material, metals, and non-metals.

17. The method of Claim 15 wherein said hermetic container further comprises a liquid refrigerant inlet and a vapor refrigerant outlet.

18. The method of Claim 17 wherein said vapor refrigerant outlet further comprises an extended outlet coil at least partially disposed in said ambient cooling zone.

19. The method of Claim 15 wherein said hermetic container further comprises a sealed power connector and a sealed signal connector.

20. The method of Claim 15 wherein said hermetic container further comprises at least one cooling fin.

21. The method of Claim 20 wherein said cooling fins are refrigerant filled.

22. The method of Claim 20 wherein said cooling fins are solid material.

23. The method of Claim 15 wherein said hermetic container and thermally isolated housing further comprise EMI shielding selected from the group consisting of metal mesh and foil.

24. The method of Claim 15 wherein said chamber cools power electronic components of vehicles selected from the group consisting of hybrid and full electric.

25. The method of Claim 15 wherein said chamber is the liquid refrigerant accumulator component of a vapor compression refrigeration system.

26. The method of Claim 15 wherein said refrigerant is selected from the group consisting of the phase change working fluids listed in ASHRAE Standard 34-2001.

27. The method of Claim 15 wherein said chamber is disposed as an intermediate-temperature evaporator component of a vapor compression refrigeration system.

28. The method of Claim 27 wherein said chamber is disposed in an intermediate pressure suction tapping line.